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Analysing the External Sector: A Comparative Study of Three G21 Nations Across Three Continents

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ABSTRACT: The evolution of global economic forums such as the G7 and G21 has played a critical role in shaping international financial stability and economic policy coordination. The research studies the external sector performance three countries from three continents under G21- the USA, the UK and Japan. The data is examined from 2000 to 2023. The five major factors of the external sector which are highlighted are GDP, international trade, direction of trade, exchange rate, and balance of payments. The study employs statistical methods, including the Compound Annual Growth Rate (CAGR), Pearson's correlation coefficient, and linear regression models, to assess the relationships between real GDP and net trade. The findings highlighted that though USA exhibited highest GDP growth, there were persistent trade deficits in both USA and UK implying structural trade imbalances. Japan faces challenges like declining foreign reserves and demographic shifts, despite stable trade relationships. Exchange rate fluctuations showed influence in trade balances with currency depreciation affecting import costs. These results show that international organizations are becoming more important in helping countries stay financially stable and strong as global economic problems change.

Keywords: External sector, International trade, Global Economy, G21, GDP growth, Balance of Payment, Exchange rate, Trade balances

1. Introduction

Global economic crisis or the familiar Oil crisis (1973) of early 1970s Lead to the formation of G7. The Arab Embargo, had an immense impact globally and lead to severe Economic recession.

This led to the formation of G7, an economic integration for policy formation to deal with the issue. 1975, first G6 conference took place in France. Government of France, The USA, Japan, West Germany, Italy, and the UK, discussed the oil shock, recession, financial crisis and measured to get over them.

Canada joined in 1976 and officially G7 was formed. The major commons among these economies were

- Liberal democracy
- Economic parameters
- Individual freedom
- Political and economic commons

Asean Financial Crisis of 1997 another huge hit for the global economy and a major financial crisis in South Korea and many other Asian countries displayed the need for the formation of G7 .1998, Due to Financial crisis in Russia, G8 was formed as Russia joined, but suspended in 2014. These challenges lead to the establishment of organizations such as ASEAN, OECD, and the G20 (1999).

Today there are 21 countries including South Africa which became the part recently and 1 EU. These top 21 countries are not just Politically and economically similar but militarily and population wise too. The member nations represent around 85% of the Global GDP, over 75% of Global trade and almost 2/3rd of the world population reside there. Till 2008 meeting were done only between Finance ministers and central bank governors of the member nations as the ultimate motive was to deal with global financial crisis.

But post 2008 crisis, PM and presidents were also asked to join this conference and the official G20 leaders submit happened in USA in 2008. For smooth working G21 uses a TROIKA SYSTEM where three nation leaders work together and no Nation has a permanent presidency, it works on rotational basis and the power shifts from the hands of one nation to another. G21's main purpose is still to provide International financial stability but with time different issues have also been looked after or discussed like climate change and sustainable-development.

2. Data and Methodology

2.1 Data and Sources

This study examines five key variables that reflect external sector performance: GDP, international trade, trade direction, exchange rates, and the balance of payments (BoP) over the period from 2000 to 2023. GDP and GDP per capita data have been sourced from the World Bank's World Development Indicators, using 2015 prices as the base year and expressed in US dollars. Trade-related figures have been obtained from the IMF's Direction of Trade Statistics. Exchange rate data for the selected countries, measured against the US dollar, come from the IMF's International Financial Statistics. Additionally, annual balance of payments data has been collected from the IMF's Balance of Payments and International Investment Position Statistics. All variables in this study are presented in US dollar terms.

2.2 Research Methodology

This study calculates the Compound Annual Growth Rate (CAGR) to analyse the long-term growth trends of all variables over the given period, with the exception of the balance of payments (BP) and its components. The performance of the BOP and its various accounts is evaluated using linear growth rates derived from a fitted linear regression model. Additionally, the study presents the trade shares of the top ten partner countries for the USA, UK, and Japan through pie charts. Line graphs are employed to depict fluctuations in exchange rates for the selected countries. Karl Pearson's coefficient of correlation is applied to examine the long-term relationship between GDP and net trade.

2.2.1. Compound Annual Growth Rate (CAGR)

The Compound Annual Growth Rate (CAGR) is used to measure the mean annual growth rate of a variable over a specified period.

$$\text{CAGR} = \left(\frac{V_{\text{final}}}{V_{\text{begin}}} \right)^{1/t} - 1$$

Where:

- $V\,final$ = Final value
- $V\,begin$ = Initial value
- n = Number of years

This formula calculates the average annual growth rate.

2.2.2. Net Balance of Payments (BoP)

The Net Balance of Payments is computed based on the International Monetary Fund (IMF) standards:
Net BoP= (Net Current Account+Net Capital Account) −Net Financial Account

2.2.3. Linear Growth Rate (LGR)

The linear growth rate is estimated using the regression model:

$$Y_t = a + bt + \epsilon_t$$

Where:

- Yt = Value of the variable at time t
- a = Intercept
- b = Growth rate coefficient
- t = Time (in years)
- εt = Error term

The coefficient b represents the linear rate of growth of the variable.

Linear Growth Rate (g%) is then calculated as:

$$g\% = \left(\frac{b}{\bar{Y}}\right) \times 100$$

Where:

- $g\%$ = Linear growth rate in percentage
- b = Estimated coefficient from the regression equation
- $\bar{Y}$ = Mean value of the dependent variable over the period

2.2.4. Pearson's Correlation Coefficient

To examine the relationship between real GDP and net trade, Pearson's correlation coefficient is computed as:

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Where:

- xi,xi = Individual observations of the two variables (GDP and net trade)
- $\bar{x}$, $\bar{y}$ = Mean values of the respective variables
- r = Correlation coefficient

The correlation coefficient r ranges between -1 and 1, indicating the strength and direction of the relationship.

2.2.5. Net Trade Calculation

Net trade is determined as:

Net Trade=Total Exports−Total Imports

A positive value indicates a trade surplus, while a negative value indicates a trade deficit.

3. Analytical Framework

This section encompasses the evaluation of the external sector performance of all selected countries for the given period of 23 years by examining the growth pattern in the selected variables. The performance of each variable will be studied which is as follows:

3.1 GDP of the Nation

Two key indicators used are real GDP and Real GDP per capita to access economic growth. Both the indicators are expressed in US dollars. The analysis is done at constant price to ensure a meaningful comparison of actual output changes over time while accounting for fluctuations in the general price level. To maintain consistency, the year 2015 has been chosen as the base year. Table (i) illustrates the growth trends of real GDP and real GDP per capita across the selected countries over the 23-year analysis period.

Table No.(i): growth of GDP (24-year CAGR)

Countries	GDP (constant 2015 US $)	GDP Per Capita (constant 2015 US $)
USA	1.2%	2%
UK	0.7%	1.3%
Japan	0.7%	0.6%

Source: World Development Indicators, World Bank

Note: Author's calculations

The GDP growth trends over the 24-year period indicate significant differences in economic performance among the selected countries. The USA displayed highest growth rate with a CAGR of 1.2% in real GDP and 2% in real GDP per capita, projecting sustained economic expansion because of productivity gains, technological advancement and robust consumer demand. On the Contrary, the UK and Japan experienced relatively lower growth rates, 0.7% GDP growth in both the countries but per capita GDP is different for both the nation's 1.3% for the UK and 0.6% for Japan.

The disparity between real GDP and GDP per capita growth rates suggests demographic differences and productivity variations. Higher per capita GDP growth in the USA and the UK shows stronger economic output per person. Lowe GDP per capita growth in Japan reflects potential demographic challenges and stagnancy in productivity like aging population and labour force constraints. Moreover, the slower overall GDP growth in Japan indicates economic headwinds, including reduced domestic demand, deflationary pressures, and structural issues. Moderate growth in the UK suggests a stable yet less dynamic economic trajectory, probably impacted by trade uncertainties post Brexit.

3.2 International Trade

Table no. (ii): growth of external trade (on the basis of 24-year CAGR)

Countries	Exports	Imports	Total Trade
US	3.8%	3.9%	3.85%
UK	2.1%	1.1%	1.60%
JAPAN	2.3%	1.4% (sig)	1.85%

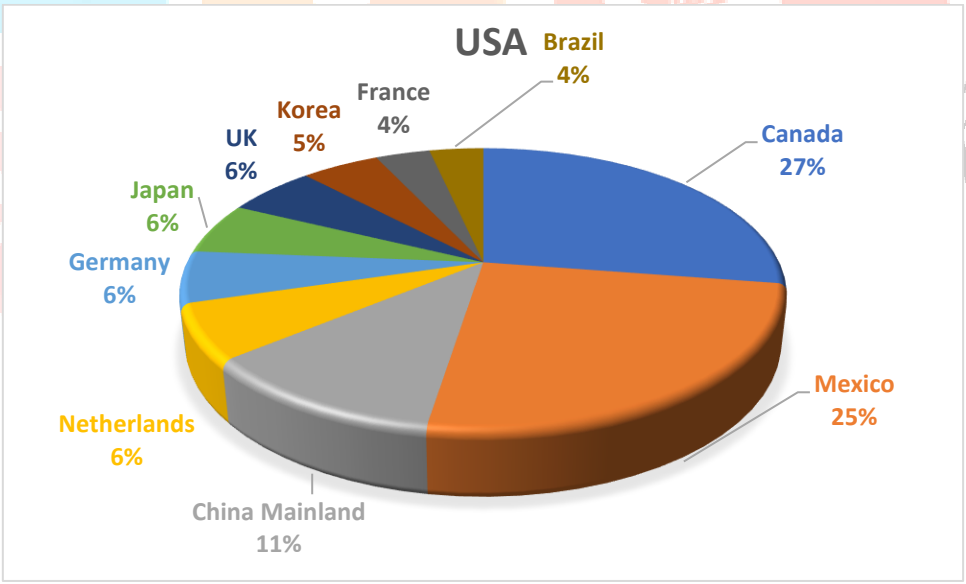
Source: Direction of Trade Statistics, IMF

Note: Author's calculation

The external trade performance as per table no. (ii) highlights key differences in export and import growth across the USA, UK, and Japan. The USA has exhibited the highest total trade growth at 3.85% CAGR, with exports growing at 3.8% and imports at 3.9%. displaying a balanced trade expansion. Moderate trade growth rate of 1.60% with 2.1% exports and 1.1% imports is showed by the UK. This suggests a stable trade environment but with lack of expansion. Japan's total trade growth stands at 1.85%, with exports at 2.3% and imports at 1.4%. Showing a relatively positive trade balance. From looking at the data we can say that the USA has been the most aggressive in expanding its global trade footprint. At the same time the UK and Japan have experienced comparatively slower but stable trade growth.

3.3 Direction of Trade Statistics

The direction of trade refers to the breakdown of trade flows among different trading partner countries. This study examines the trade relationships of the selected nations by identifying the top ten trading partners based on total trade volume in 2024.



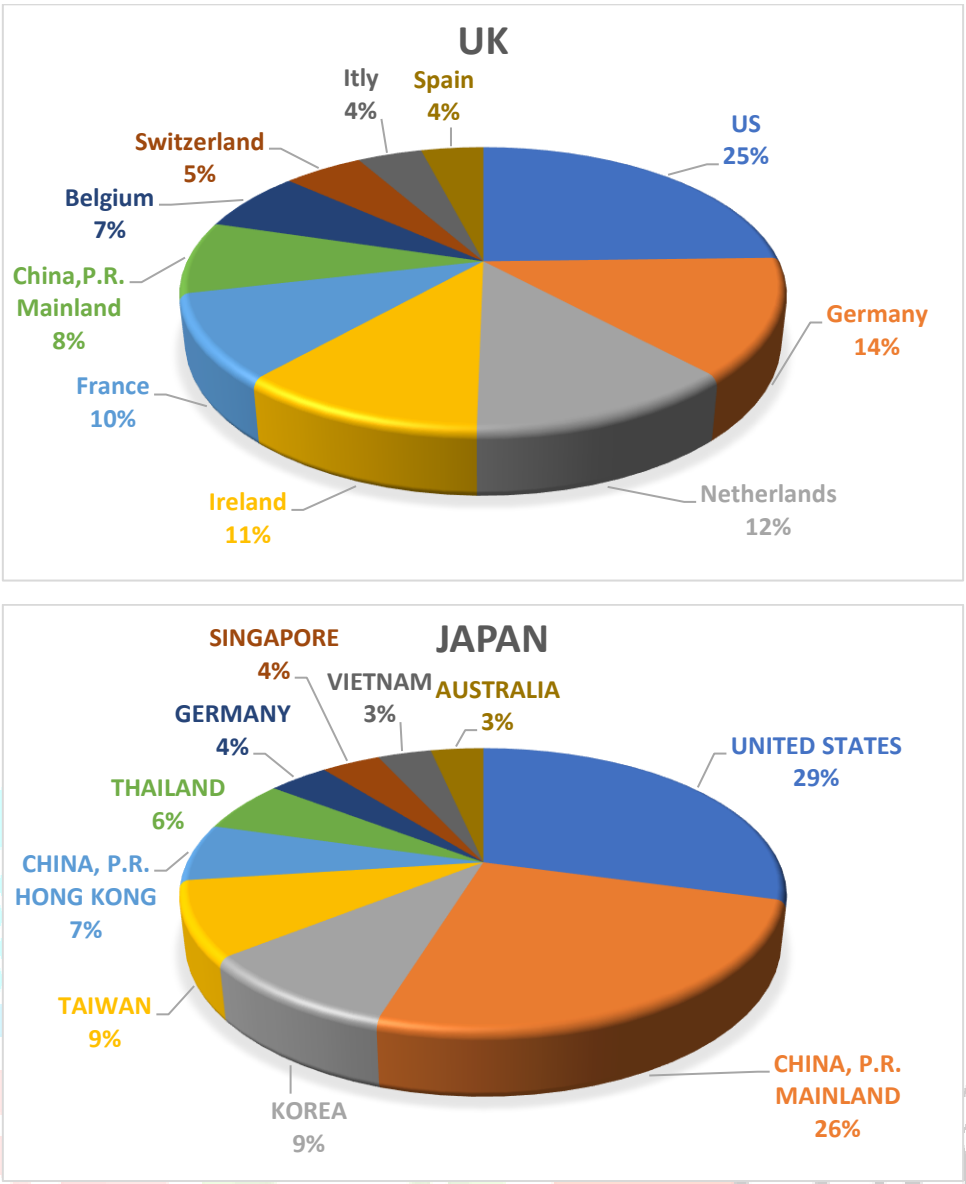


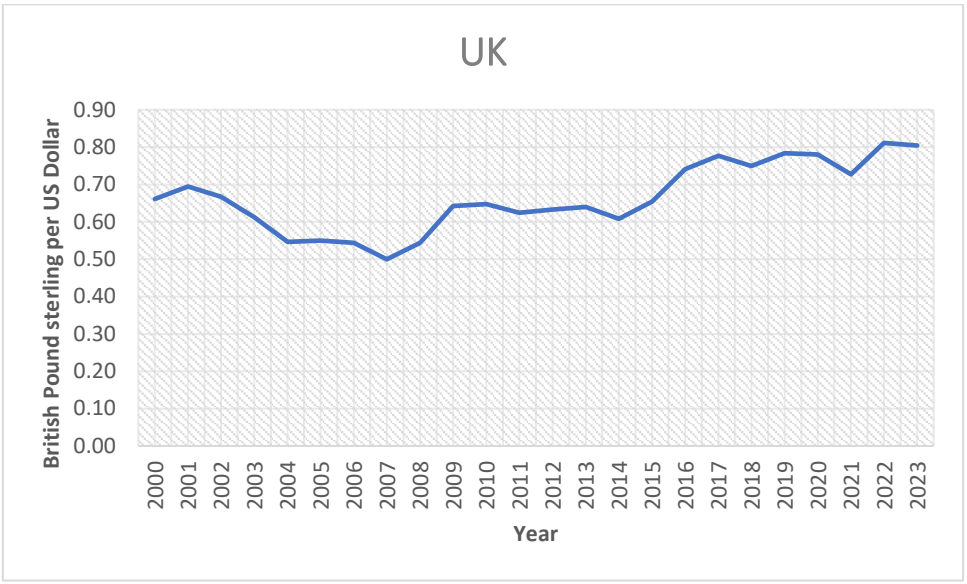
Fig 1: top 10 trading partner countries of selected countries in 2024

Source: Direction of Trade Statistics, IMF

Figure 1 delves into major trading partners of USA, UK and Japan on the basis of year 2024 total trade. In Japan 29% of external trade is done with USA and 26% with China, which shows a major dependence on these two counties. USA trades it's major chunk to Canada (27%) and Mexico (25%), again displaying a pattern on dependence to two major economies. UK's 25% external trade is done with USA, apart from that it shows quite diversified trade pattern. Overall, all three countries, have wisely diversified their trade to several nations which reduces exposure to economic disturbances and provides more opportunities to explore new global markets.

3.4 Exchange Rate

Here we are assessing exchange rates of the given countries in terms of US dollar, in the figure 2.1 and figure 2.2. Line graphs are made using the value of domestic currency per US Dollar in Fig 2.1 and in Fig 2.2 we US Dollar is taken against Japanese Yen and UK Pound Stirling



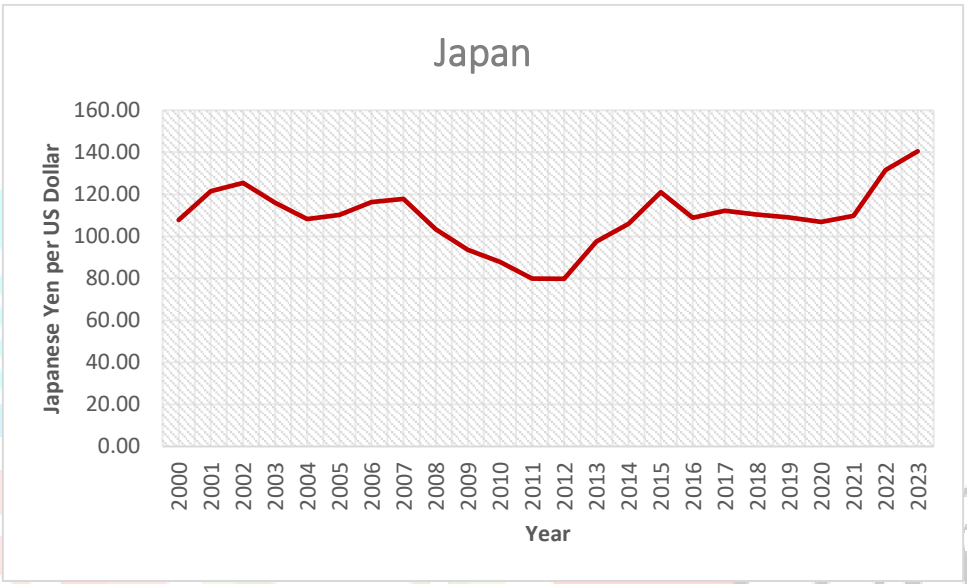
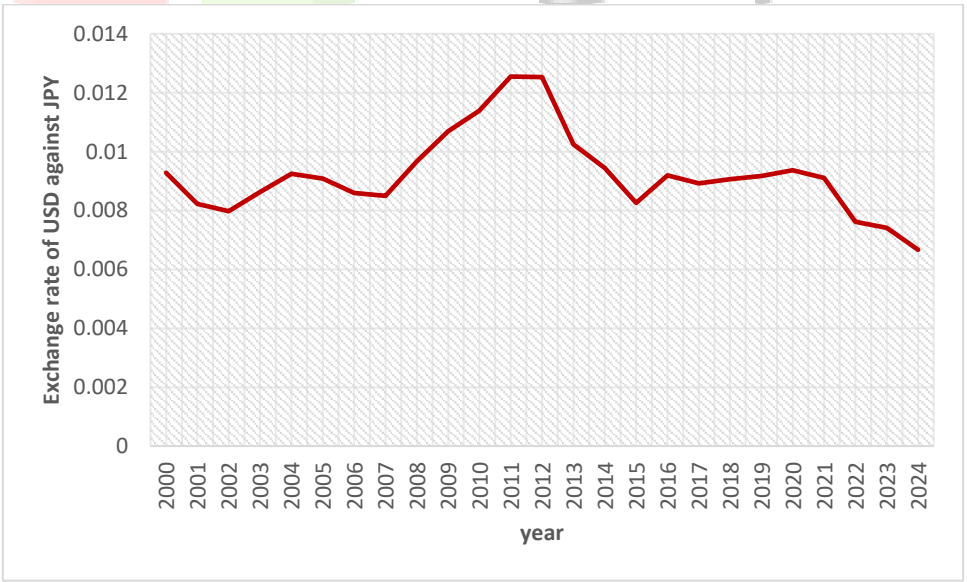


Fig 2.1- exchange rates of selected countries against US Dollar

Source: International Financial Statistics, IMF



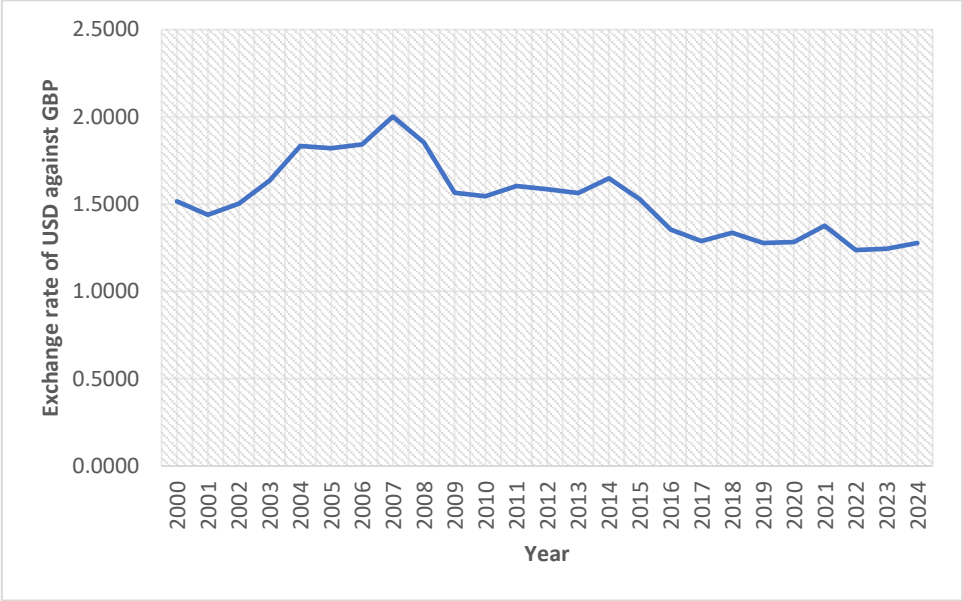


Fig 2.2- exchange rate of USD against JPY, GBP

Source: International Financial Statistics, IMF

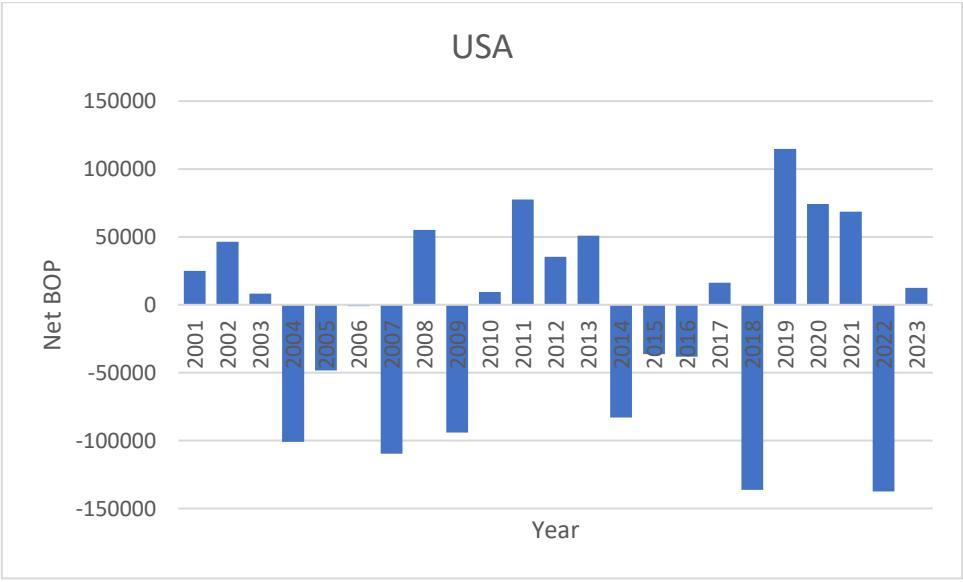
The figure 2.1 highlights the variations in the exchange rates of UK and Japan against US dollar (period average). The Japanese Yen and Pound Sterling have depreciated considerably against US dollar during the period of analysis by following multiple ups and downs. It can be seen that UK pound sterling depreciated from US $0.66 to $0.80. Similarly Japanese Yen depreciated from $107.77 to $ 140.49. This adversely impacts the import bills of UK and Japan.

Fig 2.2 shows, In terms of USA, the American dollar has strengthened against Japan (Japanese Yen) from 0.00927 JYP/USD to 0.00666 JYP/USD, and the United Kingdom (British Pound Sterling) from 1.51 GBP/USD to 1.27 GBP/USD.

3.5 Balance of Payment

The study assesses the performance of BoP in USA, UK, and Japan including its various components on the basis of linear growth rate for the given period from 2000 to 2023, as summarised in table (iii).

The net BoP is calculated using formula suggested IMF's international standards: **Net Balance of Payment= (Net current account+ Net capital account)- Net financial account**



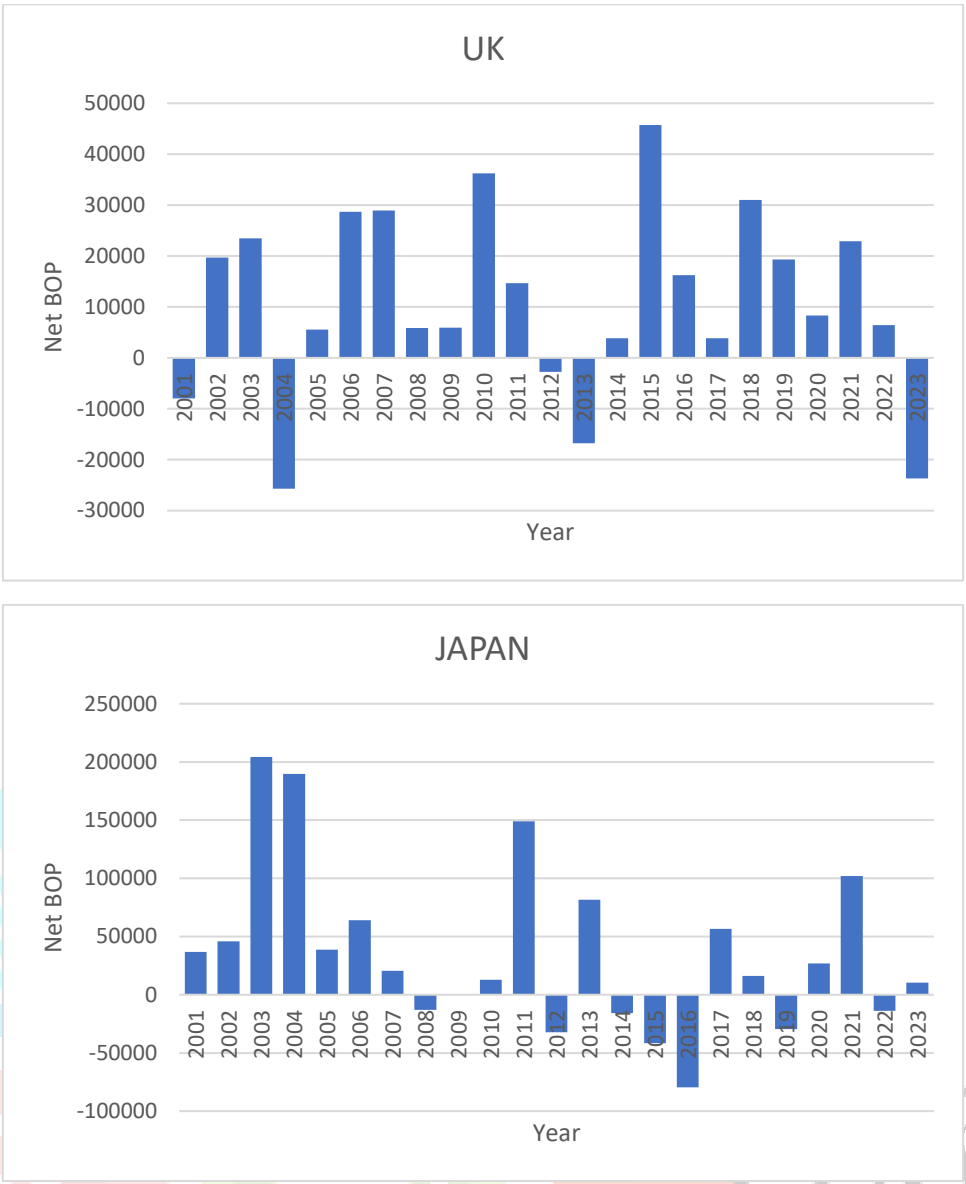


Figure 3: net Balance of Payments

Source: Balance of Payment and International Investment Position Statistics, IMF

Figure 3 demonstrates Net Balance of Payment of selected countries over the years, showing both surplus as well as deficit in BOP in different years. Further, the study estimates linear growth rates of its components which represented by Table no. (iii).

Table no.(iii) performance of BOP (on the basis of linear growth rate)

countries	Net current acc	Net capital acc	Net financial acc	Net reserve assets
USA	1.29%	1.86%	1.24%	12.36%
UK	2.48%	10.97%	2.42%	6.75%
JAPAN	0.48%	-3.44%	4.23%	-8.55%

Source - Balance of Payment and International Investment Position Statistics, IMF

Note: Author's calculations

Table no. (iii) shows that the net current account growth remained positive in all three countries USA, UK, and Japan by reporting growth rate of 1.29%, 2.48% and 0.48% respectively. Japan's Net current account growth is quite less in comparison to USA and UK. Japan possesses unfavourable net capital account growth rate of -3.44% which is an indicative of fall in net capital inflows, whereas favourable growth rate of 10.97%

in UK and 1.86% in USA's net capital account suggests the rise of net inflows of capital. A growth rate of 1.24% in USA's net financial account reflects inflow of foreign assets and investments, similarly 4.23% in Japan and 2.42% in UK. Finally, USA outpaced both the countries showing highest growth in net foreign exchange reserves of 12.36% in contrast to UK, which enjoys a net increase in the reserve assets at the rate by 6.75% and Japan, experiences a net decline in the accumulation of foreign reserves by -8.55%.

3.6 Correlation Analysis

This study employs bivariate correlation analysis to examine the relationship between real GDP and net trade in G21 countries, using Karl Pearson's correlation coefficient method. Net trade is calculated as the difference between total exports and total imports, where a positive balance represents net exports and a negative balance indicates net imports. To determine the nature of this relationship, the following hypotheses are tested:

- **H_0**: No significant linear relationship exists between real GDP and net trade in the selected countries.
- **H_1**: A significant relationship exists between real GDP and net trade in the selected countries.

The correlation results for real GDP and net trade in the USA, UK, and Japan are presented in Table.

Table no. (iv) correlation between real GDP and Net Trade (α= 0.01)

Countries	Pearson's correlation coefficient	Sig. (2-tailed)
US	-0.807	0.000
UK	-0.861	0.000
JAPAN	-0.531	0.009

Source: Correlation is significant at the 0.01 level (2-tailed)

Note: Author's Calculation

Table no. (iv) shows highly negative relationship between GDP and net trade in USA and UK displaying unfavourable trade balance. That is with rise in GDP, the net trade balance of USA and UK falls owing to high trade deficits. Here, unfavourable net trade balance hampers the economic growth of USA and UK. In Japan's case, the value of correlation coefficient is -0.531 implying a weaker negative relationship between growth and net trade balance. Here the p-value of 0.009 tells that the relationship is statistically significant and moderately strong.

4. Concluding Remarks

The analysis of external sector performance of the USA, UK, and Japan, highlights critical economic trends over the past two decades. From the analysis we get that though the USA has shown highest GDP growth among the other countries. The continuous trade deficits in the USA and the UK shows challenges in maintaining favourable BOP. At the same time Japan's weaker GDP growth is offset by its relatively stable trade relationships. From the findings one can see the role of exchange rate fluctuations in shaping external sector dynamics. The depreciation of currency has had major implications for trade balances and import costs. The balance of payments analysis reveals that while the USA and UK have seen capital inflows, Japan faces concerns over declining foreign reserves and capital account deficits. Above all, the strong negative correlation between GDP and net trade in the USA and UK suggests that economic expansion in these nations has not been accompanied by a proportional improvement in trade performance generally leading to growing trade imbalances. These results show that the role of multilateral economic forums such as the G7 and G21 are becoming more important in helping countries stay financially stable and strong as global economic problems change.

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